

# PATENT COOPERATION TREATY



## PCT

### INTERNATIONAL PRELIMINARY EXAMINATION REPORT (PCT Article 36 and Rule 70)

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| Applicant's or agent's file reference<br><b>A3-257PCT</b>  | <b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA/416) |  |
| International application No.<br><b>PCT/US2004/002622</b>  | International filing date ( <i>day/month/year</i> )<br><b>29.01.2004</b>   | Priority date ( <i>day/month/year</i> )<br><b>29.01.2003</b> |
| International Patent Classification (IPC) or both national classification and IPC<br><b>H01R4/02</b> |  |  |
| Applicant<br><b>MOLEX INCORPORATED</b>   |  |  |

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 4 sheets, including this cover sheet.  
  
☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).  
  
 These annexes consist of a total of 2 sheets.

3. This report contains indications relating to the following items:
  - I ☒ Basis of the opinion
  - II ☐ Priority
  - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
  - IV ☐ Lack of unity of invention
  - V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
  - VI ☐ Certain documents cited
  - VII ☐ Certain defects in the international application
  - VIII ☐ Certain observations on the international application

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|---|--|
| Date of submission of the demand<br><br><b>20.08.2004</b>   | Date of completion of this report<br><br><b>21.09.2004</b>   |
| Name and mailing address of the international preliminary examining authority:<br><br> <b>European Patent Office - P.B. 5818 Patentlaan 2<br/>NL-2280 HV Rijswijk - Pays Bas<br/>Tel. +31 70 340 - 2040 Tx: 31 651 epo nl<br/>Fax: +31 70 340 - 3016</b> | Authorized Officer<br><br><b>Corrales, D</b><br><br>Telephone No. +31 70 340-2645<br><br> |

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

JC20 Rec'd PCT/PTO 07 JUN 2005

International application No. PCT/US2004/002622

**I. Basis of the report**

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

**Description, Pages**

1-6 as originally filed

**Claims, Numbers**

2-8, 10-15 as originally filed

1, 9 received on 20.08.2004 with letter of 20.08.2004

**Drawings, Sheets**

1/10-10/10 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

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5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

*(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)*

6. Additional observations, if necessary:

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

|                               |             |      |
|-------------------------------|-------------|------|
| Novelty (N)                   | Yes: Claims | 1-15 |
|                               | No: Claims  |      |
| Inventive step (IS)           | Yes: Claims | 1-15 |
|                               | No: Claims  |      |
| Industrial applicability (IA) | Yes: Claims | 1-15 |
|                               | No: Claims  |      |

2. Citations and explanations

**see separate sheet**

**Re Item V**

**Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Reference is made to the following document:

D1: US-A-5 861 663 (SWAIN MILES FRANK ET AL) 19 January 1999 (1999-01-19)

The document D1 is regarded as being the closest prior art to the subject-matter of claim 1 and 9, and discloses:

An electrical connector for connecting between an electronic component and a circuit board via a plurality of solder balls soldering onto the circuit board, comprising an insulative housing forming a mounting surface adjacent to the circuit board and a receiving surface for supporting the electronic component, the insulative housing defining a plurality of channels extending through the mounting surface and the receiving surface; and a plurality of conductive plated surfaces respectively received in the corresponding channels, the channels having a mounting portion defining a pyramidal space to locate the solder ball.

The subject-matter of claims 1 and 9 therefore differs from this known connector in that: Instead of having a plated surface they have stamped terminals. This difference provides an improved terminal for locating and connecting the solder ball.

In the prior art the channels in the housing have a pyramidal space in the connecting end and are plated, providing a locating portion for the solder ball, although quite close the processes associated with the two methods are different. The terminal of claim 1 and the connector using such terminals of claim 9 are not obviously deduced from D1 and therefor the subject-matter of claims 1 and 9 is new and involves an inventive step. (Art. 33(2) and (3) PCT)

2. Claims 2-8 and 10-15 are further modifications of the subject-matter of claims 1 and 9 and therefor fulfill the requirements of Art. 33(2) and (3) PCT.
3. The application relates to electrical terminal and connector which has obviously an industrial applicability (Art. 33(4) PCT).

JC20 Rec'd PCT/PTO 07 JUN 2005

**CLAIMS:**

What is claimed is:

1. A stamped and formed conductive terminal capable of being received within a terminal channel defined in an insulative housing and between an electronic component and a circuit board, having a contact portion electrically connecting with the electronic component and a mounting portion electrically connecting with the circuit board via a solder ball,  
5 comprising:  
a first wall, a second wall connecting with the first wall in a certain angle and a third wall connecting with the second wall in a certain angle and opposite to the first wall, and the mounting portion defining a pyramidal space extending out of the insulative housing for receiving the solder ball.
2. The conductive terminal of claim 1 in which the mounting portion defines the pyramidal space by using a side wall connecting with an end of the first wall which circles around a fictitious central line as an axis.
3. The conductive terminal of claim 1 in which the mounting portion comprises a first side arm connecting with an end of the first wall and a second side arm connecting with an end of the third wall, the first side arm and the second side arm separately extend out of the insulative housing and define the pyramidal space.
4. The conductive terminal of claim 3 in which the mounting portion of the conductive terminal comprises a horizontal portion connecting with the second wall, the horizontal portion is between the first side arm and the second side arm, and has a certain degrees therebetween.
5. The conductive terminal of claim 1 in which the contact portion comprises a first spring arm formed on the first wall and a second spring arm corresponding to the first spring arm and formed on the second wall, the first spring arm and the second spring arm are adjacent to form a spring receiving structure.
6. The conductive terminal of claim 1 in which the pyramidal space is open at a top portion.

7. The conductive terminal of claim 1 in which a horizontal portion extends from one of the walls, the horizontal portion being located between the first and third walls.

8. The conductive terminal of claim 3 in which at least one of the side arms includes a recess.

9. An electrical connector for connecting between an electronic component and a circuit board via a plurality of solder balls soldering onto the circuit board, having an insulative housing forming a mounting surface adjacent to the circuit board and a receiving surface for supporting the electronic component, the insulative housing defining a plurality of terminal channels extending through the mounting surface and the receiving surface, a  
5 plurality of stamped and formed conductive terminals respectively received in the corresponding terminal channels, comprising:

10 the conductive terminal having a first wall, a second wall connecting with the first wall in a certain angle and a third wall connecting with the second wall in a certain angle and opposite to the first wall, the conductive terminal forming a contact portion electrically connecting with the electronic component and a mounting portion electrically connecting with the circuit board via the solder ball, the mounting portion defining a pyramidal space extending out of the mounting surface of the insulative housing for receiving the solder ball.

10. The electrical connector of claim 9 in which the mounting portion of the conductive terminal defines the pyramidal space by using a side wall connecting with an end of the first wall which circles around a fictitious central line as an axis.

11. The electrical connector of claim 9 in which the mounting portion of the conductive terminal comprises a first side arm connecting with the first wall and adjacent to one end of the mounting surface and a second side arm connecting with the third wall and adjacent to one end of the mounting surface, and the first side arm and the second side arm  
5 aslant extend out of the mounting surface and are apart from each other to define a cone-shaped pyramidal space.